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GB 1386058 A GB 1164368 A

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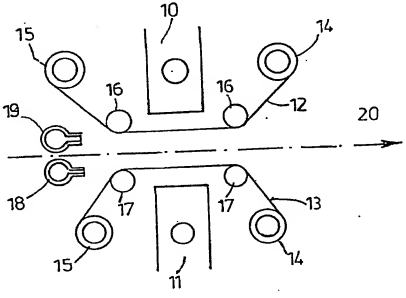
(54) Apparatus for sealing film webs

(57) Apparatus for making spaced linear seals between two superposed webs of thermoplastic material by using heated bars (10, 11) which are movable towards each other to squeeze the superposed webs (20) together. A separating sheet (12) of, e.g., Teflon, is provided to lie between the bars (10, 11) and web (20) to prevent them sticking together. When the bars (10, 11) are separated they can remain heated to improve efficiency but to avoid this melting the web (20) remaining between them the separating sheet is positioned spaced between the bars (10, 11) and web (20) to form two heat insulating air gaps. Air may be blown through these gaps to assist cooling.

Fig.3



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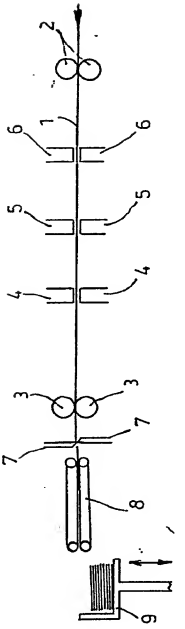

Fig.1

Fig. 2

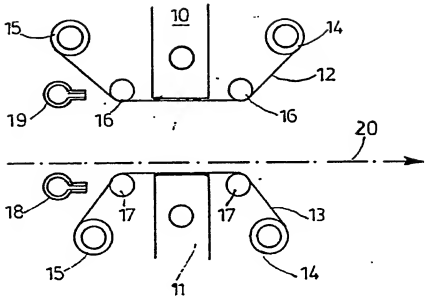
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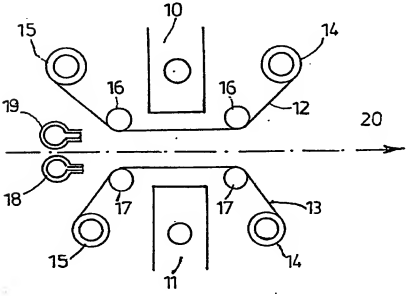
Fig.3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APPARATUS FOR SEALING FILM WEBS

The invention concerns an apparatus for sealing superposed film webs or flat lying tubular webs of a thermoplastic synthetic material, consisting of sealing bars heatable by heating appliances, which are displaceable towards each other and away from each other and over whose front surfaces there can be spread a separating sheet of a material which will not stick to the synthetic material.

With constantly heated sealing bars for providing sealing seams on film webs passed in a timed sequence between the bars, there occurs the problem that, during a temporary stoppage of the apparatus during which the sealing bars lifted off from the film web are kept at the operating temperature, the heat radiated by the bars melts the film web situated between the latter and which is not moved. To prevent such melting during operational stoppages, for example, during a lunch break, it is known to move heat-screening protective plates inbetween the sealing bars and the film web situated between them. However, because of the narrow space available for installation, the arrangement of such protective plates, requires a high expenditure on design, which leads to a considerable increase in the cost of the apparatus, in particular when several sealing apparatuses are arranged one after the other, whereof those first in line preheat the film to be sealed and the last effects the final seal.

It is, therefore the object of the invention to create an apparatus of this kind in which without the installation of protective plates, heat radiated by the sealing bars during the stoppage times does not damage a stationary film web situated between them.

In accordance with the invention, there is provided an apparatus for sealing superposed film webs of a thermoplastic synthetic material, comprising: sealing bars heatable by heaters which bars are displaceable towards and away from each other to perform the sealing operation; positioning

means for positioning a separating sheet of material over the front surfaces of the sealing bars to prevent sticking to the synthetic material; and lifting means for lifting the separating sheet off the front surfaces of the sealing bars when they are moved away from each other.

The superposed webs may be opposite sides of a tubular web.

The lifting means preferably lift the separating sheet into a position to allow air to insulate the web from the heated bar. The lifting means may be provided by arranging for the guides of the separating sheet to be movable independently of the bars.

If during times of stoppage of the apparatus, the separating sheets are lifted off from the front surfaces of the sealing bars, air gaps/cushions are formed in the gaps between said bar front surfaces and the sheets and web, which cushions, in spite of the heating of the sealing bars, keep the heat radiated by the latter away from the film web to be sealed, in such a way that the web is not melted on or damaged.

The lifting means may consist of guide rods or rollers arranged on both sides parallel to and interspaced from the sealing bars, which are displaceable between a welding position, wherein their peripheral surface lines facing each other lie approximately in the planes of the front surfaces of the sealing bars encompassed by them, and an inactive position wherein gaps are formed between the front surfaces and the planes defined by the guide rods or the like. The guide rods or the like may be displaceable in guideways of the supports of the sealing bars.

The guide rods or the like may deflect the separating sheet respectively drawn off from a roller and wound up on a roller.

Rows of air-blast nozzles may be arranged on both sides of the conveyance plane of the webs to be sealed between the latter and the separating sheets, through which air can be

blown continuously or in a timed sequence approximately parallel to the conveyance direction of the webs to be sealed. Such air-blast combs are known and serve, for example, for the free conveyance of one end of a web to be sealed, advanced by conveyance rollers, between the opened jaws of a welding or sealing apparatus. After a sealing seam or weld seam has been produced, they promote the detachment of the sealing seams from the sealing jaws.

If the webs to be sealed are passed by conveyance rollers between the sealing bars, the air-blast nozzles or air-blast combs only serve to detach the sealing seams from the sealing jaws, and in particular to cool the sealing seams. During times of stoppages, blast air can be blown out continuously or in a timed sequence, to prevent overheating. In addition, provision may be made for temperature sensors which during stoppage times activate the air-blast nozzles and switch them off as required.

During times of stoppages, the sealing bars may be moved no further away from each other than is the case during one step of conveying the film web to be sealed. However, during the stoppage times, care must be taken that sufficiently large gaps exist between the separating sheets and the film webs to be sealed on the one hand, and the separating sheets and the front surfaces of the sealing bars on the other hand, so control or an arrangement to that effect can be provided.

An exemplary embodiment of the invention will be explained in greater detail below with reference to the drawings, in which

FIGURE 1 is a schematic side view of a bag manufacturing machine having several sealing stations;

FIGURE 2 is an enlarged representation of one of the sealing stations according to Figure 1 during the sealing operation; and

FIGURE 3 shows the sealing station shown in Figure 2 during a stoppage of the apparatus while the sealing bars

continue to be heated.

In the apparatus of Figure 1, a flat lying tubular film web 1 drawn off from a stock roll, not shown, is provided with interspaced transverse sealing seams, and subsequently sack or bag workpieces are separated off from the tubular film web and are stacked.

The tubular film web 1 is drawn off from a stock roll by a drawing roller pair 2. It then passes in a timed sequence through three sealing stations arranged at predetermined distances one after the other, each containing pairs of sealing bars 4, 5, 6, the first two stations whereof serve for the preheating and the last station for the final execution of the transverse sealing seam. The conveyance of the tubular film web 1 to be provided with transverse sealing seams through the sealing stations is effected by a drawing roller pair 3 driven in a timed sequence.

The drawing roller pair 3 is followed down the line by a separating cutter arrangement 7 by means of which individual sections are separated from the flat and sealed tubular film web 1. These sections are then fed via a double belt conveyor 8 to a lowerable stacking table 9 and are stacked thereon in the usual way. As shown in Figure 2, in this arrangement each pair of sealing bars consists of an upper sealing bar 10 and a lower sealing bar 11. Both sealing bars are at their front sides covered by a Teflon band 12 and 13 respectively, which firmly contacts the sealing bars 10 and 11. On both sides of each sealing bar 10 and 11 respectively, reels 14 and 15 are provided so that at predetermined intervals, the Teflon band 12 and 13 respectively can be moved on by a small amount being wound off from the reels 15 and wound up on the reels 14. For guiding the Teflon band 12 and 13 respectively, guide rods 16 and 17 respectively are provided which are arranged on both sides of the upper and lower sealing bar 10 and 11. As viewed in the conveying direction, the sealing bars 10 and 11 are preceded by air-blast nozzles 18 and 19, by means of which one ensures that

the film web 20 is detached after the sealing process from the Teflon bands 12 and 13. During operation of the apparatus represented in Figure 1, the web 20 is drawn forward in a timed sequence, the sealing being effected during each stopping stage. For this purpose, the upper sealing bar 10, together with the guide rods 16, the reels 14 and 15 and the air-blast nozzle 19, moves downwards until the laid flat tubular film web 20 is pressed by the upper sealing bar 10 onto the lower sealing bar 11 which remains stationary during the operation of the machine. After the time required for the sealing, the sealing bar 10 together with the devices associated therewith moves back into its upper initial position. This process is repeated in a timed sequence.

Now if, for any reason, e.g. the lunch break, the machine is to be stopped, the temperature regulating devices for the two sealing bars must not switched off, since otherwise, the heating time required during restarting would be too long. However, to nevertheless prevent the heat of radiation emanating from the sealing bars 10 and 11 from melting the film web situated between them, the sealing bars 10 and 11 and the teflon bands 12 and 13 are moved into the position represented in Figure 3, whereby an air gap is formed on the one hand between the sealing bars 10 and 11 and the Teflon bands 12 and 13 and on the other hand, between the Teflon bands 12 and 13 and the film web 20. As has been proved by practical experiments, this air gap is sufficient to screen the film web 20 adequately from the heat of radiation. If required, this measure can be further promoted by blowing a cooling airflow from the air-blast nozzles 18 and 19 constantly or only in a timed sequence. For clarification of the paths through which the sealing bars and Teflon bands respectively are moved towards each other, it should be pointed out that the tubular film web 20 occupies the same height level both in Figure 2 and in Figure 3.

C L A I M S

1. An apparatus for sealing superposed film webs of a thermoplastic synthetic material, comprising: sealing bars heatable by heaters which bars are displaceable towards and away from each other to perform the sealing operation; positioning means for positioning a separating sheet of material over the front surfaces of the sealing bars to prevent sticking to the synthetic material; and lifting means for lifting the separating sheet off the front surfaces of the sealing bars when they are moved away from each other.

2. An apparatus according to claim 1, wherein lifting means consist of guides arranged on both sides parallel to and spaced from the sealing bars, which are displaceable between a welding position where lie approximately in the planes of the front surfaces of their associated sealing bar, and an inactive position, wherein gaps are formed between the said front surfaces and the planes defined by the guides.

3. An apparatus according to claim 1 or 2, wherein the guides deflect the separating sheet respectively drawn off from a roll and wound up on a roll.

4. An apparatus according to one of claims 1 to 3, wherein on both sides of the conveying plane of the webs to be sealed, rows of air-blast nozzles are arranged between them and the separating sheets for blowing air out approximately parallel to the conveyance direction of the film webs to be sealed.

5. Apparatus according to claim 4 comprising means for continuously blowing air through the nozzles.

6. Apparatus according to claim 4 comprising means for intermittently blowing air through the nozzles.

7. Apparatus according to any one of the preceding claims wherein the superposed webs are opposite sides of a tubular web.

8. Apparatus according to any one of the preceding claims wherein the guides are linearly extending rods.

9. Apparatus according to any one of claims 1 to 7 wherein the guides are linearly extending rollers.

10. Apparatus for sealing superposed film webs constructed and arranged to operate substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition L) B5K

(ii) Int Cl (Edition 5) B29C

Search Examiner
A HABBIJAM

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search
16.6.93

Documents considered relevant following a search in respect of claims 1-10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 1386058 (WINDMOLLER & HOLSCHER)	
A	GB 1164368 (THIMONNIER AND CIE)	

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

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